Economic Analysis
2001-2002 Proposed Capital Project

High Pressure Turbine
Dense Pack Modification

Approximately two years ago, GEC Alsthom came to Intermountain and presented information on a proposed renovation of the high pressure turbines. GE has subsequently also contacted us regarding the same modification.

The proposed modification involves changing the existing double-flow hp nozzle box to a single flow design. By doing this they are able to add stages to the hp turbine and increase hp section efficiency. Both GEC and GE claim to have data from installed units showing an increase in turbine efficiency (decrease in flow to achieve the same output) of at least 2.0%.

The modification will be a turnkey performance contract including pre- and post-installation testing on the hp turbine section for contract validation. The following economic analysis is provided for both performance benefits and increased generation capacity.

Economic assumptions:

1- Economic life:	20 years (PV of Annuity Factor 11.2)
2- Hours of operation/year:	8340 (8760 - 2.5 weeks ave.outage)
3- Cost of money:	6.35%
4- Cost of generation:	$27,000/ unit hour ($30.86/MW hr)
5- Avoided cost of maintenance during 2003 outage:	$708,000

6- Avoided cost of lost generation to rehab the hp nozzle: $1,944,000 (3 days of estimated 10 required)

Additional Generation Capacity at Existing Steam Flow:

Additional potential revenue
(2.0%)(875MW)($30.86/MW hr)(8340 hrs/yr) = $4,504,017

Payback: $3,348,000 (6,000,000 - items 5&6) / $4,504,017 = 0.7 years

Cost/ Benefit Ratio: (4,504,017)(11.2)/(3,348,000) = 15.1

Heat Rate Improvement at 875MW:

Fuel Savings
(2.0%)(6.3MMlb/hr steam flow)(916 BTU/lb)(1/.88 boiler eff.)(875/830)($1.51/MMBTU) (8760hrs/yr)(0.9cap factor)
= $1,646,027/yr

Payback: $3,348,000 / $1,646,026 = 2.0 years

Cost/Benefit Ratio: ($1,646,027 X 11.2)/(3,348,000) = 5.5